

Roll-to-Roll Solution-Processible Small-Molecule OLEDs (R2R SM OLEDs)

Prime Recipient: GE Global Research

Subcontractor: DuPont Display

Contract #: DE-EE0003250

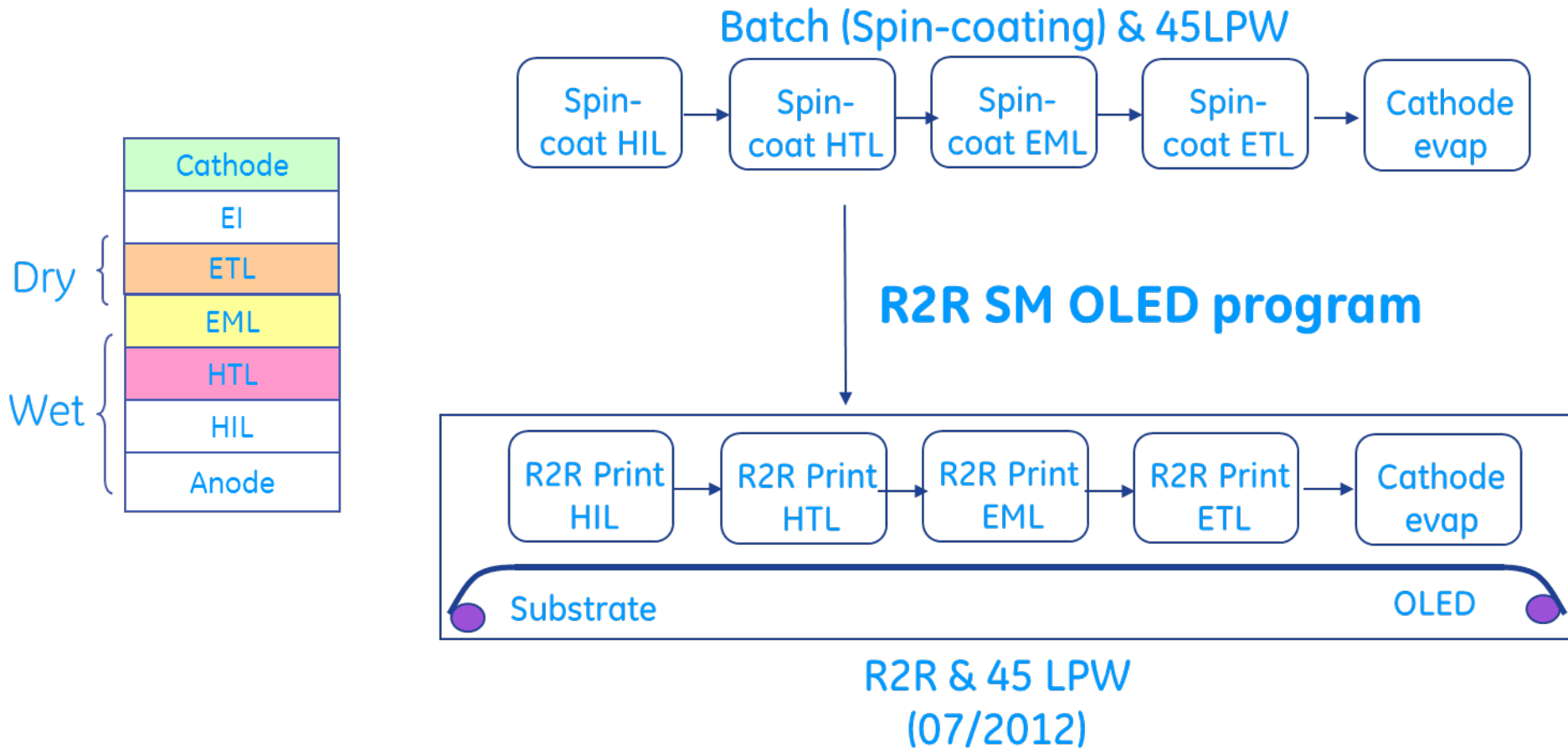
NETL Project Manager: Clark Robinson

Principal Investigator: Jie Jerry LIU

GE Global Research

DOE SSL Manufacturing R&D Workshop, San Jose, CA, June 13-14, 2012

Program Objective

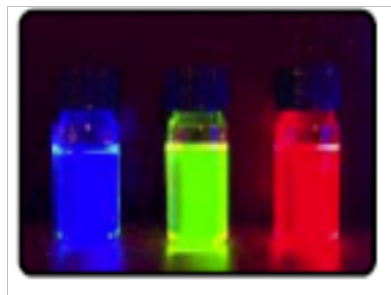


OLED mat'ls/inks, processes, equipment, input materials, supply chain ...

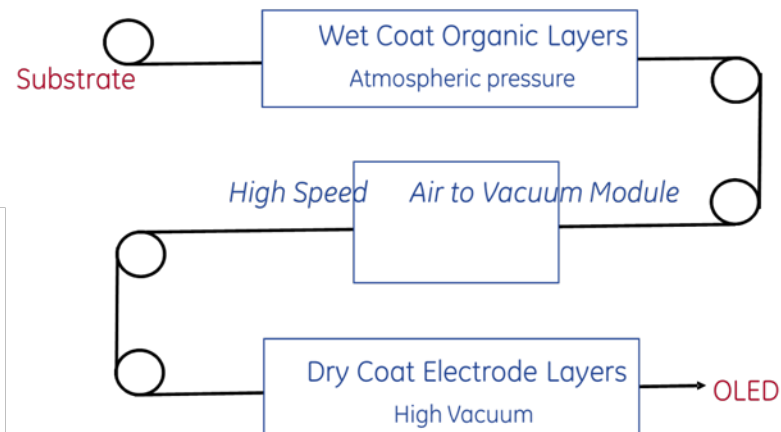
Team Expertise

Cathode
EI
ETL
EML
HTL
HIL
Anode

DuPont: Wet-coatable OLED materials



GE: all wet & orthogonal



GE: R2R R&D infrastructure

Program Milestones & Status

Milestone	Description	Date of completion	
		Target	Actual (est)
1	Complete SM-OLED ink-formulation & process specification	Q4	Q4
2	Demonstrate 20LPW R2R SM-OLED	Q4	Q5
3	Emission uniformity with variation in brightness <20%	Q7	Q5 Q9* (est.)
4	Completion of all wet R2R SM OLED architecture design	Q7	Q7
5	Demonstration of 45LPW R2R SM-OLED	Q8	Q9* (est.)

Key technical achievements

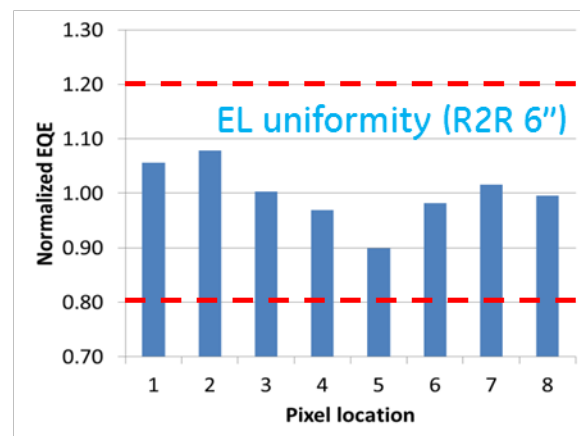
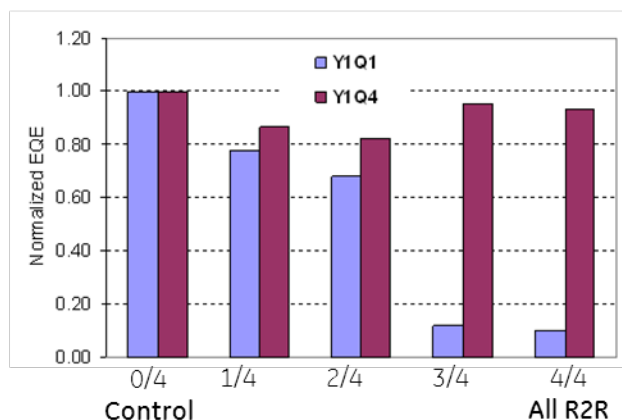
1. Proven wet-coating capable for high performance

With external light extraction only

	LPW	CCT (K)	CRI	dBB
WHITE	62	3000	85	0.002

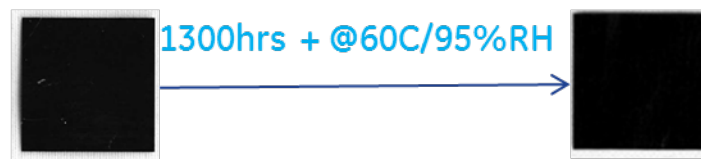
	T70 (hrs)	T50 (hrs)
RED	~55,000	~130,000
GREEN	~170,000	~300,000

2. Developed equipment designs & process know-hows



3. Retired major component risks key to (R2R) OLED

- (low-cost) barrier substrates
- (low-cost) encapsulation



Program Summary

1. Program execution on/within budget

2. Achieved significant risk-reduction for Wet OLEDs

- Retired major coating-related risks
- Retired major equipment-related risks
- Retired major component-related risks

3. Proven entitlement for wet OLEDs

- Demonstrated all wet-coated Green & Red OLEDs w/ record life
- Demonstrated all wet-coated White OLEDs w/ record LPW

4. Future plans

- Process & equipment optimization to minimize footprint & capex
- Material & process optimization to minimize operation cost
- High rate cathode deposition for thru-put

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